



Interview

John French

Can very low-carbon buildings be constructed cheaply enough to suit the pockets of private-sector commercial developers? Yes, says Professor John French, who has set himself that target in his new role as director of sustainability for Cambridge Innovation Parks. But to do so involves overhauling approaches to procurement, contracting, materials and risk. Report by Jackie Whitelaw.

PROFESSOR JOHN FRENCH is probably best known as the client for what has been called Britain's greenest commercial building – the University of East Anglia's (UEA) Enterprise Centre in Norwich (**Figure 1**).

The building has picked up over 30 awards, including the Structural Award for Sustainability 2017 from the Institution of Structural Engineers, and is cited as an exemplar of low-carbon design. Its timber frame, made largely of wood sourced from Thetford Forest in Norfolk, involved the creation of a new local supply chain and its walls include hanging strips of thatch. These have helped deliver a structure that is the lowest of the low in terms of embodied carbon, and which meets Passivhaus and BREEAM 'Outstanding' standards – the first to have achieved both accreditations.

French, as chief executive of the university's Low Carbon Group, set out to prove such a building could be constructed. He drove his construction team to deliver performance that will be demanded as normal as the UK government's zero-carbon 2050 regime digs in.

'The project brief included 70% bio-based material – hence the timber frame and the thatch, a local supply chain, design that suited the local vernacular, and a carbon load of just 400kg/m² over 100 years,' he says.

But that came at a cost of 10% above the commercial norm, which is not uncommon for Passivhaus buildings.

Leading the way

Some commentators see ultra-low-carbon buildings, such as the Enterprise Centre, as vanity projects, but there is a view that the reality is that the sector is desperately in need of

leadership.

French is hoping to provide some of that in his new role as director of development and sustainability for Cambridge Innovation Parks, bringing together his university-level experience gained at UEA and the University of Cambridge, in a commercial, agile, private-sector setting.

Getting to zero carbon is a necessity, he says. 'We are not going to get to a zero-carbon 2050, or even meet the intermediate 2030 targets, unless there is a step change in low-carbon construction by the private sector. It's an experiment we are living through.'

French has developed his construction expertise over a couple of decades and his focus on sustainability

↓ **FIGURE 1:** UEA's award-winning Enterprise Centre meets both Passivhaus and BREEAM 'Outstanding' standards



grew from his education, first as an applied biologist at the University of London and then through a PhD in applied plant sciences at Cambridge.

'The idea of better, greener buildings has been a glint in my eye since 2005. That's when I was writing the alternative non-food crop strategy for the East of England, which was about growing plants for their fibres to make materials as well as things like vaccines. The UK used to be good at using plants such as flax, linseed and hemp for construction, fabrics for aeroplanes or natural paints. To meet the 2050 carbon targets, we have to include more bio-based material in building design.'

'Bio-based solutions were the obvious route for the Enterprise Centre and are the way ahead in general,' French says. 'Timber, as one example, is clearly a good way to contribute to zero carbon in the building structure. But the big challenge is creating an affordable, sustainable timber supply chain and making sure there are no substitutions that are less carbon efficient.'

His first focus at Cambridge Innovation Parks is on an initial two low-carbon buildings at its Waterbeach site (**Figure 2**), planned for delivery in 2021 and 2022.

The first, of 9000sq.ft, will have a hybrid steel-and-timber structure. The second, of 40 000sq.ft, aims to be a modularised sawn-timber concept, with subsequent structures to follow that model.

There are many lessons from his experience at the Enterprise Centre that French is bringing to the Cambridge site.

'One of the things you learn about large low-carbon timber buildings is that they require a lot of innovation in order to deliver the wide spans and airtight outer layer. The energy flow is complex, so your engineers need to be at their creative best.'

'Timber traceability is really critical. The wood has to be certified to the sustainable, global FSC standard and then you have to make sure that what is specified is what you get. When considering embodied carbon, you don't want North American pine substituted for European timber from closer to home. At the Enterprise Centre, we had a timber trace map



FIGURE 2: Timber solutions are a key aspect of the low-carbon design for Cambridge Innovation Parks' new Waterbeach buildings

for the building. Through keeping a close eye on what was actually being ordered, 70% of the stud work and core structure was locally sourced Thetford Forest pine,' he says.

He is aware of the risk of substitutions and that a cost-efficient option can play havoc with low-carbon ambitions. 'You need your whole professional team to be sharp-eyed and to double down on the specification,' he says.

Educating engineers

Pursuing zero carbon will mean that understanding timber sourcing will have to be a core skill for engineers and procuring it will require upheaval in the current UK timber supply chain, French says.

'The UK is one of the worst offenders for using imported timber even though we have our own timber industry. We are third in the world for imports. And we have the highest mark-up from raw to building material.'

To create a path to a more cost-efficient supply and new innovations, Cambridge Innovation Parks has launched a timber challenge to the supply chain, working with BRE and 3PM (**Box 1**).

Also key to cost reduction is weaning structural engineers off glued laminated (glulam) and cross-laminated timber in favour of simpler sawn timber. 'I can understand why engineers prefer engineered timber,' French says. 'It's robust and it gives them comfort, but



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for most buildings it is over-engineered. And it is too expensive. I need engineers to spend time understanding timber technology and the cost profile.

'I've built my house in Scotland using green oak to create wide spans and it is wrapped with insulated structural timber panels to create the walls. It was quick and cheap to build. The housing sector is leading on low-carbon timber building and commercial office designers could learn from their innovations. The key challenge for structural engineers working with wood is to understand the range of different ways in which timber frames can deliver structural integrity, and the scope that exists for different types of timber and composite materials to be deployed.'

Changing attitudes

The leaps in innovation needed to meet zero carbon do require a response from clients and investors, particularly in terms of taking a fair share of the risk, French believes. 'Part of the answer has to be integrated project insurance backed by the client, or innovation just won't happen.

BOX 1. THE TIMBER CHALLENGE

Cambridge Innovation Parks' timber challenge has been launched to help it create one of the first fully sustainable business campuses in the UK. The focus will be not just on construction and operation, but leading sustainable approaches such as carbon offsetting and wellbeing provision.

The team wants to hear from like-minded innovators who specialise in the production and provision of off-site timber construction that can be applied to a commercial project.

To enter the challenge and get the full brief, contact Eleanor Turner at eleanor.turner@bregroup.com.

'At the moment, as soon as you mention sustainability, it adds 20% to the price because it is assumed the job is going to be difficult. That frightens the clients and everyone opts for what they know. At the same time, the industry's whole methodology is based on overestimating, so it can never be called out for being wrong. The result is a sector that is deeply risk averse, overpriced and sleep walking into a crisis. The deadline for the 2030 carbon targets is just nine years away. We have to be designing and building for that now.'

Across-the-board collaboration, design for off-site modular construction and procurement based on the carbon footprint, as well as the price, all have to be employed, he says.

French tests the quality of structural engineers by insisting they have to go for modular design. 'If they say it is too difficult, then I say they have to work harder at it. It's about client leadership.

'The relationship between client and

structural engineer can be a weak link, as it is often not close; engineers need to step out of the shadows to build the relationship with the client and give confidence,' he says.

The demand for sustainable buildings is there from the client side, French says. 'I gave a talk to property developers recently and the response was excellent. They all want to build zero/low-carbon buildings and they are open to being led that way.

'Clients have investors who are thinking long term and demanding buildings that will meet the carbon targets. The same is true of tenants – they want to know their building has been sustainably built; this will all drive demand.

'There is a huge opportunity for structural engineers to step in and be the guiding hand that gives the clients the confidence to argue against over-specification and deliver the lean, low-carbon solutions that translate into competitive rents.

'Lean, efficient, sustainable timber – that's the future.'



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